What Cows are telling Us
Real World Novus C.O.W.S. Monitoring

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C.O.W.S./Ruminant Technical Services
Management effects on milk production

47 Herds fed same TMR

Production ranged by **29 lb/d**
(45-74 lbs.)

Non-dietary factors accounted for **56%** of variation in milk yield

- Stocking density (+**1.7 lb/cow** per 10% reduction)
- Feeding for refusals (+**3.5 lb/cow**)
- Feed push-ups (+**8.7 lb/cow**)

(Bach et al., 2008)
Novus C.O.W.S. Program

Comprehensive assessment program

Identifying and unlocking bottlenecks

Optimizing cow comfort and well-being

Improving productive efficiency

Contributing to sustainability
History of the Program
The Novus C.O.W.S. Program

Master’s project - University of British Columbia (UBC), 2008

Novus partnered in 2010

Novus Program, 2011
Traditional Benchmark

• Mature, high production

• Primarily Holstein
Novus C.O.W.S. Assessments

Phase One
Create Benchmarks
- March 2010
- CA: 43
- NY/PA/VT: 40
- TX/NM: 35

Phase Two
Implementation
- May 2011
- US: 706 in 27 states
- Canada: 138 in 6 provinces

Over 1100 assessments conducted in North America
Novus C.O.W.S. Benchmarks

- **California**
  - 67 freestall dairies
- **Openlots**
  - 53 openlot dairies
- **Northeast**
  - 226 freestall dairies
- **Midwest**
  - 83 freestall dairies
- **Canada**
  - 52 freestall dairies
Novus C.O.W.S. Benchmarks

![Graph showing lying time (h/d) for different dairies]

- Northeast: 11.0 h/d
- California: 10.3 h/d
- Midwest: 11.5 h/d
- Open Lot: 10.2 h/d
- Canada: 11.2 h/d
Products supported by C.O.W.S.

Mintrex® MAAC®
- Improves reproductive performance
- Boosts vaccine response
- Reduces somatic cell count
- Improves lameness

Agrado® Plus
- Increases energy corrected milk
- Reduces the risk of milk fat depression
- Supports oxidative balance
Novus C.O.W.S. Program

On-farm Assessment

Cow-based measures

- Lying time
- Hock and knee injuries
- Lameness
Novus C.O.W.S. Program

On-farm Assessment

Management/facility measures

Stall design

Bedding quality

Stocking density
Measuring lying time

Lactating Pens

40 cows receive data loggers

1-min intervals

Averaged over 3 days
Economics of lying time - Milk yield and Lying time

\[ Y = 49.2 + 3.7X \]
\[ R^2 = 0.31 \]

\(~3.7 \text{ lb/d more milk for each extra hour of lying down}\)

(Miner Institute Database; Grant, 2007)
Novus C.O.W.S. Midwest Data

Average Lying Time vs. Pen Milk Production

Parameter Estimates
Intercept = 55.26
Slope = 3.443

3.9 lbs. adjusted
Novus C.O.W.S. Freestall Dairies

Average Lying Time vs. Pen Milk Production

Parameter Estimates
Intercept = 79.065
Slope = 1.7686

$P = 0.02$
C.O.W.S. Midwest Data - Fresh

Average Lying Time vs. Pen Milk Production

Parameter Estimates:
- Intercept = -25.97
- Slope = 10.871

Equation:
- $P = 0.11$
- $R^2 = 0.63$
Phase One

• The dairy has a current Veterinarian-Client- Patient Relationship form
• All employees sign Dairy Cattle Care and Ethics Training Agreement
• Tail docking stopped by January 1, 2017

Phase Two

Herd Health Plan - Protocols
- Newborn and milk-fed calves
- Pain management.
- Non-ambulatory animals
- Euthanasia

Phase Two

✔ Lameness - 95% of the lactating and dry dairy herd scores a 2 or less (1=sound, 2=mild, 3=severe)

✔ Hock & Knee - 95% or more of lactating and dry dairy herd score a 2 or less (1=no abrasion, 2=hair loss, 3=swelling/open wound)

✔ Body Condition - 99% of all classes of animals score a 2 (Scale 1-5)

✔ Hygiene – 90% Score 2 or less all animals (Scale 1-4)
Lameness Prevalence (%)
### GPS Herds Assessed

<table>
<thead>
<tr>
<th></th>
<th>GPS Herds</th>
<th>Benchmark Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Lame (%)</td>
<td>24.8</td>
<td>28.2</td>
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<tr>
<td>Severe Lame (%)</td>
<td>2.2</td>
<td>4</td>
</tr>
<tr>
<td>Overall Hock Injuries (%)</td>
<td>10.3</td>
<td>18</td>
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<tr>
<td>Severe Hock Injuries (%)</td>
<td>4.3</td>
<td>3.4</td>
</tr>
<tr>
<td>Knee Injuries (%)</td>
<td>1.7</td>
<td>3</td>
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<tr>
<td>Lying Time (h/d)</td>
<td>11.64</td>
<td>11.40</td>
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<tr>
<td>Water space (in.)</td>
<td>1.8</td>
<td>2.4</td>
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<tr>
<td>Bunk Space (in.)</td>
<td>20.3</td>
<td>20.4</td>
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<tr>
<td>Stall Stocking Density (%)</td>
<td>128</td>
<td>112</td>
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<tr>
<td>Time away from Pen</td>
<td>3.93</td>
<td>4.14</td>
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<tr>
<td>Pen Milk (lbs.)</td>
<td>97.6</td>
<td>94.9</td>
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</tbody>
</table>
Novus C.O.W.S.

Transition Cow Assessments
Introduction of the Transition Cow

Transition cows experience **physiological**, **immune** and **nutritional** changes (Goff and Horst, 1997)

- Estimated that **50% of cows have one or more adverse health events** during the transition period (Ferguson, 2001)

- Up to **25% of cows are culled or die within 60 DIM** (Godden et al., 2003)

- Approximately 55% of the cows that die on farm, occurs within **100 DIM** (Raboisson et al., 2011)
Novus C.O.W.S.

Traditional Benchmark

• Mature, high production

• Primarily Holstein

Transition Pens

• Close-up pen for focal cows

• Evaluate Far-Off, Close-up and Fresh
Novus Transition C.O.W.S. Data

**Outcome Measures**
- Lying Time
- Lameness
- Hock & Knee Injuries
- Body Condition
- Lactation number
- Health – 60 DIM
- Production – 120 DIM
- Reproduction – 120 DIM

**Facility & Management Measures** (Far-off, close-up, fresh)
- Stocking Density
- Bunk Space
- Water Space
- Time Away from Pen
- Comingle
Measuring lying time

**Lactating Pens**

40 cows receive data loggers

1-min intervals

Averaged over 3 days

**Transition Pens**

40 cows receive data loggers

1-min intervals

Attached 10-14 before calving

22 d of lying behavior
Transition Timeline

-14 DIM
Attach loggers
LS, BCS, HI, KI
Facility

10-14 DIM
Remove loggers
LS, BCS, HI, KI
Facility

23 days later

60 & 100 DIM
DC305 Back-up
Report Delivery
Facility & Welfare
Health Events
Novus Transition C.O.W.S. Data

**Daily Lying Time**

- **Week Relative to Calving**
- **Daily Lying Time (h/d)**

- **Heifer**
- **2nd Lact**
- **Mature**
<table>
<thead>
<tr>
<th>Week Relative to Calving</th>
<th>Heifer</th>
<th>2\textsuperscript{nd} Lact</th>
<th>Mature</th>
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<tbody>
<tr>
<td>-3</td>
<td>15.67</td>
<td>15.08</td>
<td>14.36</td>
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<td>3</td>
<td>12.21</td>
<td>13.28</td>
<td>11.11</td>
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</tbody>
</table>
Novus Transition C.O.W.S. Data

Daily Lying Bouts

Week Relative to Calving

Lying Bouts (no./d)

-3 -2 -1 0 1 2 3

Heifer
2nd Lact
Mature
Novus Transition C.O.W.S. Data

Lying Bout Duration

-3 -2 -1 0 1 2 3

Lying Bout Duration (min/bout)

Heifer
2nd Lact
Mature
Lying Behavior and Lameness
Novus Transition C.O.W.S. Data

Daily Lying Time (h/d)

Week Relative to Calving

Not Lame
Mild Lame
Severe Lame

P < 0.05
Novus Transition C.O.W.S. Data

Lying Bouts

-3 -2 -1 0 1 2 3
Week Relative to Calving

Lying Bout Duration

-3 -2 -1 0 1 2 3
Week Relative to Calving

Not Lame
Mild Lame
Severe Lame
Lying Time and Health
Novus Transition C.O.W.S. Data

Healthy vs. Sick Lying Time

<table>
<thead>
<tr>
<th>Week Relative to Calving</th>
<th>Healthy</th>
<th>Sick</th>
</tr>
</thead>
<tbody>
<tr>
<td>-3</td>
<td>14</td>
<td>13</td>
</tr>
<tr>
<td>-2</td>
<td>13</td>
<td>12</td>
</tr>
<tr>
<td>-1</td>
<td>12</td>
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<tr>
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<td>9</td>
</tr>
<tr>
<td>2</td>
<td>10</td>
<td>9</td>
</tr>
<tr>
<td>3</td>
<td>10</td>
<td>9</td>
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</tbody>
</table>

Daily Lying Time (h/d)

Solutions Service Sustainability™ 37
Novus C.O.W.S. Transition Data

Individual NE Dairy (Metritis vs. Healthy)

Lying Time (h/d)

Day relative to calving
Prepartum Lying Behavior and Metritis

Daily lying time of 1st (going onto 2nd) lactation cows

-3
-2
-1

Lying time (h/d)

Healthy
Metritis

* - means within week differ ($P < 0.05$)
No differences between heifers and cows

Lobeck-Luchterhand et al., 2014
What else is new?
Central Database

• Centralized data
  – Reduced report turnaround
  – Minimize errors
  – Data Analysis

• Potential customized reports
  – Cohorts
  – Breeds
  – Production levels
Questions?